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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/633,276

07/31/2003

G. Laurie Miller

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08/24/2005

EXAMINER

SCHINDLER, DAVID M

Patent Counsel
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ART UNIT

PAPER NUMBER

2862

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,276

Applicant(s)

MILLER ET AL.

Examiner

David Schindler

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 8/01/2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 23-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.



Bot Ledynh
Primary Examiner

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 7/31/03, 1/9/04, 8/12/04, 1/24/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This action is in response to the communication filed 8/01/2005.

Election/Restrictions

2. Claims 23-53 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 8/01/2005.

Claim Objections

3. Claims 13, 16, and 19 are objected to because of the following informalities:

Regarding Claim 13,

The phrase "the polishing surface" on line 3 lacks antecedent basis.

The phrase "the polishing surface" on line 3 appears to be missing a period at the end of the phrase.

Regarding Claim 16,

The phrase "the group" on lines 1-2 lacks antecedent basis.

Regarding Claim 19,

The phrase "the platen, including complementary ..." on line 2 is awkward. It is recommended to instead use the phrase "the platen includes complementary."

The phrase "with complementary features of the patent" on lines 4-5 is awkward. It is first noted the above term "patent" appears to be incorrect and it appears this term should be changed to "platen." Secondly, it is recommended to change the above phrase to "with the complementary features of the platen" for clarity purposes.

The phrase "the one or more protrusions" on line 5 lacks antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-3, 6-9, 12-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Johansson et al. (herein referred to as "Johansson") (2002/007031).

Regarding Claim 1,

Johansson discloses a platen (24) to support a polishing surface (Figures 1 and 2A / note polishing pad (30)), and an eddy current monitoring system (40) to generate an eddy current signal (Page 3, Paragraph [0034]), the eddy current monitoring system including: an elongated core (42) positioned at least partially in the platen (Figure 2A), the elongated core having a length and a width, the length longer than the width (Figure 6).

Note that Examiner is interpreting the height to be from the top to the bottom of the core shown in Figure 6, the length is from the left to the right of the core shown in Figure 6, and the width is from the front to the back of the core shown in Figure 6.

Regarding Claim 2,

Johansson discloses the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface (Figures 1, 2A, and 6).

Regarding Claim 3,

Johansson discloses a coil (46) coupled with at least one of the one or more protrusions (Figure 6).

Regarding Claim 6,

Johansson discloses including another coil (44) coupled with the back portion (Figure 6).

Regarding Claim 7,

Johansson discloses the length is at least twice the width ((Figure 6) and (Page 3, Paragraph [0036])).

Note that width of the core is one side of the square (from the front of the core to the back of the core) of the cross-section mentioned in the above paragraph.

Regarding Claim 8,

Johansson discloses the length is between about five millimeters and about ten centimeters ((Page 3, Paragraph [0036]) and (Figure 6)).

Regarding Claim 9,

Johansson discloses the width is less than about a centimeter ((Page 3, Paragraph [0036]) and (Figure 6)).

Regarding Claim 12,

Johansson discloses an elongated core (42) having a length and a width (Figure 6), the length longer than the width (Figure 6), a housing having mounting features shaped and configured to position the elongated core in a recess of a platen (See Paragraph Below), a coil (46) wound around a portion of the elongated core (Figure 6),

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a drive system (48) to generate a current in the coil (Page 3, Paragraph [0034]), and a sense system to derive a characteristic of a conductive region based on eddy currents in the conductive region (Page 3, Paragraph [0035] / specifically note: lines 8-16).

Johansson does not explicitly disclose a housing having mounting features shaped and configured to position the elongated core in a recess of a platen. Johansson does disclose an elongated core (42) positioned in a recess (26) of a platen (24) (Figures 1 and 2A). Given the description and Figures 2A, 4A-4C, 5, and 6 of Johansson, it is noted that there must be a housing having mounting features shaped and configured to position the elongated core in the recess of the platen so that the core is held in the desired position, and to allow proper function of the device as described in the Johansson prior art. Also, please note Figure 2A of Johansson in comparison with applicant's Figure 13.

Note that Examiner is interpreting the height to be from the top to the bottom of the core shown in Figure 6, the length is from the left to the right of the core shown in Figure 6, and the width is from the front to the back of the core shown in Figure 6.

Regarding Claim 13,

Johansson discloses the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface (Figures 1, 2A, and 6).

Regarding Claim 14,

Johansson discloses including a coil (46) coupled with at least one of the one or more protrusions (Figure 6).

Regarding Claim 15,

Johansson discloses the elongated core includes a ferrite material (Page 3, Paragraph [0036]).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Kingsbury (5,142,228).

Johansson discloses as explained above.

Johansson does not disclose the coil includes woven wire.

Kingsbury discloses the coil includes woven wire (Column 8, Lines 14-15 / note Litz wire).

It would have been obvious to a person of ordinary skill in the art to modify Johansson to include the coil includes woven wire as taught by Kingsbury in order to enhance the sensitivity of the coil (Column 8, Lines 14-15).

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Ramey et al. (herein referred to as "Ramey") (2,608,860).

Johansson discloses as explained above.

Johansson further discloses the one or more protrusions include a first protrusion (42a) and a second protrusion (42b) (Figure 6), and wherein the coil (46) is coupled with the first protrusion and the second protrusion (Figure 6).

Johansson does not disclose the coil is coupled in a figure eight configuration.

Ramey discloses the coil is coupled in a figure eight configuration ((Figure 1) and (Column 2, Lines 37-50).

It would have been obvious to a person of ordinary skill in the art to modify Johansson to include the coil is coupled in a figure eight configuration as taught by Ramey in order to reduce circulating currents due to interwinding capacitance (Column 3, Lines 23-25).

10. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Murakami et al. (herein referred to as "Murakami") (6,057,684).

Regarding Claim 10,

Johansson discloses as explained above.

Johansson does not disclose the eddy current monitoring system further includes a shield positioned proximate an outer surface of the elongated core.

Murakami discloses an inductive magnetic sensor (50) further includes a shield (56) positioned proximate an outer surface of the elongated core (Figure 20) (Column 13, Lines 64-65).

It would have been obvious to a person of ordinary skill in the art to modify Johansson to include the eddy current monitoring system further includes a shield positioned proximate an outer surface of the elongated core given the above disclosure and teaching of Murakami in order to prevent external signals from interfering with the function of the eddy current monitoring system.

Regarding Claim 11,

Johansson does not disclose the shield includes a gap.

Murakami discloses the shield includes a gap ((Column 13, Lines 64-68) and (Column 14, Lines 1-16)).

It would have been obvious to a person of ordinary skill in the art to modify Johansson to include the shield includes a gap as taught by Murakami in order to prevent the shield from influencing the core ((Column 13, Last Line) and (Column 14, Lines 1-16) / note lines 1-6).

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11. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Naitoh et al. (herein referred to as "Naitoh") (6,232,775).

Johansson discloses as explained above.

Johansson does not disclose the ferrite material is chosen from the group consisting of a MnZn ferrite material and a NiZn ferrite material.

Naitoh discloses the ferrite material is chosen from MnZn (Column 17, Lines 29-40).

It would have been obvious to a person of ordinary skill in the art to modify Johansson to include the ferrite material is chosen from MnZn as taught by Naitoh in order to have high permeability and small eddy current loss due to large electrical resistance (Column 17, Lines 37-41).

12. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Kiko (2004/0150500).

Regarding Claim 17,

Johansson discloses as explained above.

Johansson does not disclose the elongated core is coated with a material.

Kiko discloses the elongated core is coated with a material ((Page 8, Paragraph [0099]) and (Figure 2A)).

It would have been obvious to a person of ordinary skill in the art to modify

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Johansson to include the elongated core is coated with a material as taught by Kiko in order to protect the windings from damage or abrasion (Page 8, Paragraph [0099], Lines 9-11).

Regarding Claim 18,

Johansson does not disclose the material includes parylene.

Kiko discloses the material includes parylene (Page 8, Paragraph [0099]).

It would have been obvious to a person of ordinary skill in the art to modify Johansson to include the material includes parylene as taught by Kiki in order to protect the windings from damage or abrasion (Page 8, Paragraph [0099], Lines 9-11).

13. Claims 19- 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Kiko (2004/0150500) and in further view of Tada et al. (herein referred to as "Tada") (2002/0047705).

Regarding Claim 19,

Johansson in view of Kiko discloses as explained above.

Johansson discloses the platen (24), including complementary mounting features to receive the housing, a polishing pad (30) having a polishing surface mounted to the platen (Figure 2A), such that mounting features of the housing engage with complementary features of the platen and a top surface of one of the one or more protrusions of the elongated core is positioned near the polishing surface of the pad ((Figure 2A) and (See Statement Below).

Johansson in view of Kiko does not disclose that when the mounting features of the housing engage with complementary features of the platen a top surface of one of the one or more protrusions of the elongated core is positioned about two millimeters or less from the polishing surface of the pad.

Tada discloses a distance from the polishing surface which is the top surface of the polishing cloth (105) to the top surface of the eddy current sensor is set to 1.3 millimeters ((Page 1, Paragraph [0099]) and Figures 1,3A, and 3B)).

It would have been obvious to a person of ordinary skill in the art to modify Johansson in view of Kiko to include that when the mounting features of the housing engage with complementary features of the platen a top surface of one of the one or more protrusions of the elongated core is positioned about two millimeters or less from the polishing surface of the pad given the above disclosure and teaching of Tada in order to enhance the detection functionality of the eddy current sensor.

It is noted as stated in the rejection of Claim 12 that Johansson does not explicitly disclose a housing configured to position the elongated core in a recess of the platen. However, it is again noted that Johansson must include a housing for this purpose. Given the description and Figures 2A, 4A-4C, 5, and 6 of Johansson, it is further noted that in Johansson must also include the platen including complementary mounting features to receive the housing, such that mounting features of the housing engage with complementary features of the platen and a top surface of one of the one or more protrusions of the elongated core is positioned near the polishing surface of the pad, so that the core is held in the desired position, and to allow proper function of the

device as described in the Johansson prior art. Also, please note Figure 2A of Johansson in comparison with applicant's Figure 13.

Regarding Claim 20,

Johansson in view of Kiko does not disclose the top surface is positioned between about one millimeter and about two millimeters from the polishing surface.

Tada discloses a distance from the polishing surface which is the top surface of the polishing cloth (105) to the top surface of the eddy current sensor is set to 1.3 millimeters ((Page 1, Paragraph [0099]) and Figures 1,3A, and 3B)).

It would have been obvious to a person of ordinary skill in the art to modify Johansson in view of Kiko to include the top surface is positioned between about one millimeter and about two millimeters from the polishing surface given the above disclosure and teaching of Tada in order to enhance the detection functionality of the eddy current sensor.

Regarding Claim 21,

Johansson discloses the elongated core has a generally U-shaped cross section (Figure 6).

14. Claim 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Johansson et al. (herein referred to as "Johansson") (2002/007031) in view of Kiko (2004/0150500) and Tada et al. (herein referred to as "Tada") (2002/0047705) and in further view of Murakami et al. (herein referred to as "Murakami") (6,057,684).

Johansson in view of Kiko and Tada does not disclose the elongated core has a

generally E-shaped cross section.

Murakami discloses the elongated core (51) has a generally E-shaped cross section (Figure 16).

It would have been obvious to a person of ordinary skill in the art to modify Johansson in view of Kiko and Tada to include the elongated core has a generally E-shaped cross section as taught by Murakami in order to improve the sensitivity of the eddy current sensing system.

Double Patenting

15. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

16. Claims 1, 2, 3, 6, 7, 8, 9, 12, 13, 14, and 15 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") (2002,0077031).

Regarding Claim 1,

Birang discloses a polishing pad having a polishing surface, an eddy current monitoring system including a ferromagnetic body positioned on a side of the polishing surface, the ferromagnetic body extending at least partially through the polishing pad, the polishing pad includes a recess formed in a bottom surface thereof, and the ferromagnetic body is positioned into the recess, and the polishing pad is attached to a platen, and the ferromagnetic body is supported by the platen (Claims 8-10).

Birang does not disclose an eddy current monitoring system to generate an eddy current signal, and the eddy current monitoring system includes an elongated core positioned at least partially in the platen, the elongated core having a length longer than its width.

Johansson discloses an eddy current monitoring system to generate an eddy current signal (Page 3, Paragraph [0034]), and the eddy current monitoring system includes an elongated core (42) positioned at least partially in the platen (24) (Figures 2A and 6), the elongated core having a length longer than its width (Figure 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include an eddy current monitoring system to generate an eddy current signal, and the eddy current monitoring system includes an elongated core positioned at least partially in the platen, the elongated core having a length longer than its width as taught by Johansson in order to protect the magnetic field apparatus from the polishing environment, to reduce overpolishing and underpolishing the substrate, and to sense the change in thickness of the metal layer on a substrate by sensing the change in the

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strength of the eddy currents ((Page 2, Paragraph [0012]) and (Page 3, Paragraph [0035])).

Note that Examiner is interpreting the height to be from the top to the bottom of the core shown in Figure 6, the length is from the left to the right of the core shown in Figure 6, and the width is from the front to the back of the core shown in Figure 6.

Regarding Claim 2,

Birang does not disclose the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface.

Johansson discloses the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface (Figures 1, 2A, and 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface as taught by Johansson in order to improve flux guidance and to sense the change in thickness of the metal layer on a substrate by sensing the change in the strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Regarding Claim 3,

Birang does not disclose a coil coupled with at least one of the one or more protrusions.

Johansson discloses a coil (46) coupled with at least one of the one or more protrusions (Figure 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include a coil coupled with at least one of the one or more protrusions as taught by Johansson in order to have a sense coil that can sense the change in thickness of a metal layer on a substrate by sensing the change in the strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Regarding Claim 6,

Birang does not disclose including another coil coupled with the back portion.

Johansson discloses including another coil (44) coupled with the back portion (Figure 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include another coil coupled with the back portion as taught by Johansson in order to have a drive coil that is used to generate an oscillating magnetic field that generates eddy currents in a metal layer of a substrate (Page 3, Paragraph [0035]).

Regarding Claim 7,

Birang does not disclose the length is at least twice the width.

Johansson discloses the length is at least twice the width ((Figure 6) and (Page 3, Paragraph [0036])).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the length is at least twice the width as taught by Johansson in order to increase the area of the substrate that is monitored along the length of the core.

Note that width of the core is one side of the square (from the front of the core to the back of the core) of the cross-section mentioned in the above paragraph.

Regarding Claim 8,

Birang does not disclose the length is between about five millimeters and about ten centimeters.

Johansson discloses the length is between about five millimeters and about ten centimeters ((Page 3, Paragraph [0036]) and (Figure 6)).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the length is between about five millimeters and about ten centimeters as taught by Johansson in order to provide a core length of sufficient size to sense the change in thickness of the metal layer on a substrate by sensing the change in the strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Regarding Claim 9.

Birang does not disclose the width is less than about a centimeter.

Johansson discloses the width is less than about a centimeter ((Page 3, Paragraph [0036]) and (Figure 6)).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the width is less than about a centimeter as taught by Johansson in order to provide a core width that allows the eddy current monitoring system to sense the change in thickness of the metal layer on a substrate by sensing the change in the

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strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Regarding Claim 12,

Birang discloses a polishing pad having a polishing surface, an eddy current monitoring system including a ferromagnetic body positioned on a side of the polishing surface, the ferromagnetic body extending at least partially through the polishing pad, the polishing pad includes a recess formed in a bottom surface thereof, and the ferromagnetic body is positioned into the recess, and the polishing pad is attached to a platen, and the ferromagnetic body is supported by the platen (Claims 8-10).

Birang does not disclose an elongated core having a length longer than its width, a housing having mounting features shaped and configured to position the elongated core in a recess of a platen, a coil wound around a portion of the elongated core, a drive system to generate a current in the coil, and a sense system to derive a characteristic of a conductive region based on eddy currents generated in the conductive region.

Johansson discloses an elongated core (42) having a length and a width (Figure 6), the length longer than the width (Figure 6), a housing having mounting features shaped and configured to position the elongated core in a recess of a platen (See Paragraph Below), a coil (46) wound around a portion of the elongated core (Figure 6), a drive system (48) to generate a current in the coil (Page 3, Paragraph [0034]), and a sense system to derive a characteristic of a conductive region based on eddy currents in the conductive region (Page 3, Paragraph [0035] / specifically note: lines 8-16).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include an elongated core having a length longer than its width, a housing having mounting features shaped and configured to position the elongated core in a recess of a platen, a coil wound around a portion of the elongated core, a drive system to generate a current in the coil, and a sense system to derive a characteristic of a conductive region based on eddy currents generated in the conductive region given the above disclosure and teaching of Johansson in order to protect the magnetic field apparatus from the polishing environment, to reduce overpolishing and underpolishing the substrate, and to sense the change in thickness of the metal layer on a substrate by sensing the change in the strength of the eddy currents ((Page 2, Paragraph [0012]) and (Page 3, Paragraph [0035])).

Johansson does not explicitly disclose a housing having mounting features shaped and configured to position the elongated core in a recess of a platen. Johansson does disclose an elongated core (42) positioned in a recess (26) of a platen (24) (Figures 1 and 2A). Given the description and Figures 2A, 4A-4C, 5, and 6 of Johansson, it is noted that there must be a housing having mounting features shaped and configured to position the elongated core in the recess of the platen so that the core is held in the desired position, and to allow proper function of the device as described in the Johansson prior art. Also, please note Figure 2A of Johansson in comparison with applicant's Figure 13.

Note that Examiner is interpreting the height to be from the top to the bottom of the core shown in Figure 6, the length is from the left to the right of the core shown in Figure 6, and the width is from the front to the back of the core shown in Figure 6.

Regarding Claim 13,

Birang does not disclose the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface

Johansson discloses the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface (Figures 1, 2A, and 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the elongated core includes a back portion and one or more protrusions extending perpendicularly from the back portion towards the polishing surface as taught by Johansson in order to improve flux guidance and to sense the change in thickness of the metal layer on a substrate by sensing the change in the strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Regarding Claim 14,

Birang does not disclose the coil coupled with at least one of the one or more protrusions.

Johansson discloses including a coil (46) coupled with at least one of the one or more protrusions (Figure 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the coil coupled with at least one of the one or more protrusions as taught by Johansson in order to have a sense coil that can sense the change in thickness of a metal layer on a substrate by sensing the change in the strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Regarding Claim 15,

Birang does not disclose the elongated core includes a ferrite material.

Johansson discloses the elongated core includes a ferrite material (Page 3, Paragraph [0036]).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the elongated core includes a ferrite material as taught by Johansson in order to have high permeability and small eddy current loss due to large electrical resistance.

This is a provisional obviousness-type double patenting rejection.

17. Claim 4 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") (2002,0077031) and in further view of Kingsbury (5,142,228).

Birang in view of Johansson discloses as explained above.

Birang in view of Johansson does not disclose the coil includes woven wire.

Kingsbury discloses the coil includes woven wire (Column 8, Lines 14-15 / note Litz wire).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the coil includes woven wire as taught by Kingsbury in order to enhance the sensitivity of the coil (Column 8, Lines 14-15).

This is a provisional obviousness-type double patenting rejection.

18. Claim 5 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") (2002,0077031) and in further view of Ramey et al. (herein referred to as "Ramey") (2,608,860).

Birang in view of Johansson discloses as explained above.

Birang does not disclose the one or more protrusions include a first protrusion and a second protrusion, and wherein the coil is coupled with the first protrusion and the second protrusion in a figure eight configuration.

Johansson further discloses the one or more protrusions include a first protrusion (42a) and a second protrusion (42b) (Figure 6), and wherein the coil (46) is coupled with the first protrusion and the second protrusion (Figure 6).

It would have been obvious to a person of ordinary skill in the art to modify

Birang to include the one or more protrusions include a first protrusion and a second protrusion, and wherein the coil is coupled with the first protrusion and the second protrusion as taught by Johansson in order to use a sense coil that can sense the change in thickness of a metal layer on a substrate by sensing the change in the strength of the eddy currents (see Page 3, Paragraph [0035] about sensing the change in thickness).

Birang in view of Johansson does not disclose the coil is coupled in a figure eight configuration.

Ramey discloses the coil is coupled in a figure eight configuration ((Figure 1) and (Column 2, Lines 37-50).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the coil is coupled in a figure eight configuration as taught by Ramey in order to reduce circulating currents due to interwinding capacitance (Column 3, Lines 23-25).

This is a provisional obviousness-type double patenting rejection.

19. Claims 10 and 11 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") (2002,0077031) and in further view of Murakami et al. (herein referred to as "Murakami") (6,057,684).

Regarding Claim 10,

Birang in view of Johansson discloses as explained above.

Birang in view of Johansson does not disclose the eddy current monitoring system further includes a shield positioned proximate an outer surface of the elongated core.

Murakami discloses an inductive magnetic sensor (50) further includes a shield (56) positioned proximate an outer surface of the elongated core (Figure 20) (Column 13, Lines 64-65).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the eddy current monitoring system further includes a shield positioned proximate an outer surface of the elongated core given the above disclosure and teaching of Murakami in order to prevent external signals from interfering with the function of the eddy current monitoring system.

Regarding Claim 11,

Birang in view of Johansson does not disclose the shield includes a gap.

Murakami discloses the shield includes a gap ((Column 13, Lines 64-68) and (Column 14, Lines 1-16)).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the shield includes a gap as taught by Murakami in order to prevent the shield from influencing the core ((Column 13, Last Line) and (Column 14, Lines 1-16) / note lines 1-6).

This is a provisional obviousness-type double patenting rejection.

20. Claim 16 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") (2002,0077031) and in further view of Naitoh et al. (herein referred to as "Naitoh") (6,232,775).

Birang in view of Johansson discloses as explained above.

Birang in view of Johansson does not disclose the ferrite material is chosen from the group consisting of a MnZn ferrite material and a NiZn ferrite material.

Naitoh discloses the ferrite material is chosen from MnZn (Column 17, Lines 29-40).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the ferrite material is chosen from MnZn as taught by Naitoh in order to have high permeability and small eddy current loss due to large electrical resistance (Column 17, Lines 37-41).

This is a provisional obviousness-type double patenting rejection.

21. Claims 17 and 18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in

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view of Johansson et al. (herein referred to as "Johansson") and in further view of Kiko (2004/0150500).

Regarding Claim 17,

Birang in view of Johansson discloses as explained above.

Birang in view of Johansson does not disclose the elongated core is coated with a material.

Kiko discloses the elongated core is coated with a material ((Page 8, Paragraph [0099]) and (Figure 2A)).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the elongated core is coated with a material as taught by Kiko in order to protect the windings from damage or abrasion (Page 8, Paragraph [0099], Lines 9-11).

Regarding Claim 18,

Birang in view of Johansson does not disclose the material includes parylene.

Kiko discloses the material includes parylene (Page 8, Paragraph [0099]).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson to include the material includes parylene as taught by Kiko in order to protect the windings from damage or abrasion (Page 8, Paragraph [0099], Lines 9-11).

This is a provisional obviousness-type double patenting rejection.

22. Claims 19-21 provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") and Kiko (2004/0150500) and in further view of Tada et al. (herein referred to as "Tada") (2002/0047705).

Regarding Claim 19,

Birang in view of Johansson and Kiko discloses as explained above.

Birang discloses a polishing pad having a polishing surface mounted to the platen (Claim 10).

Birang does not disclose a platen, including complementary mounting features to receive the housing, such that when the mounting features of the housing engage with complementary features of the platen, a top surface of one of the one or more protrusions of the elongated core is positioned about two millimeters or less from the polishing surface of the pad.

Johansson discloses the platen (24), including complementary mounting features to receive the housing, a polishing pad (30) having a polishing surface mounted to the platen (Figure 2A), such that mounting features of the housing engage with complementary features of the platen and a top surface of one of the one or more protrusions of the elongated core is positioned near the polishing surface of the pad ((Figure 2A) and (See Statement Below).

It would have been obvious to a person of ordinary skill in the art to modify

Birang to include the platen, including complementary mounting features to receive the housing, a polishing pad having a polishing surface mounted to the platen, such that mounting features of the housing engage with complementary features of the platen and a top surface of one of the one or more protrusions of the elongated core is positioned near the polishing surface of the pad as taught by Johansson in order to ensure proper eddy current measurement of a substrate with the use of the eddy current monitoring system.

Birang in view of Johansson and Kiko does not disclose that when the mounting features of the housing engage with complementary features of the platen a top surface of one of the one or more protrusions of the elongated core is positioned about two millimeters or less from the polishing surface of the pad.

Tada discloses a distance from the polishing surface which is the top surface of the polishing cloth (105) to the top surface of the eddy current sensor is set to 1.3 millimeters ((Page 1, Paragraph [0099]) and Figures 1,3A, and 3B)).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson and Kiko to include that when the mounting features of the housing engage with complementary features of the platen a top surface of one of the one or more protrusions of the elongated core is positioned about two millimeters or less from the polishing surface of the pad given the above disclosure and teaching of Tada in order to enhance the detection functionality of the eddy current sensor.

It is noted as stated in the rejection of Claim 12 that Johansson does not explicitly disclose a housing configured to position the elongated core in a recess of the

platen. However, it is again noted that Johansson must include a housing for this purpose. Given the description and Figures 2A, 4A-4C, 5, and 6 of Johansson, it is further noted that in Johansson must also include the platen including complementary mounting features to receive the housing, such that mounting features of the housing engage with complementary features of the platen and a top surface of one of the one or more protrusions of the elongated core is positioned near the polishing surface of the pad, so that the core is held in the desired position, and to allow proper function of the device as described in the Johansson prior art. Also, please note Figure 2A of Johansson in comparison with applicant's Figure 13.

Regarding Claim 20,

Birang in view of Johansson and Kiko does not disclose the top surface is positioned between about one millimeter and about two millimeters from the polishing surface.

Tada discloses a distance from the polishing surface which is the top surface of the polishing cloth (105) to the top surface of the eddy current sensor is set to 1.3 millimeters ((Page 1, Paragraph [0099]) and Figures 1,3A, and 3B)).

It would have been obvious to a person of ordinary skill in the art to modify Birang in view of Johansson and Kiko to include the top surface is positioned between about one millimeter and about two millimeters from the polishing surface given the above disclosure and teaching of Tada in order to enhance the detection functionality of the eddy current sensor.

Regarding Claim 21,

Birang does not disclose the elongated core has a generally U-shaped cross section.

Johansson discloses the elongated core has a generally U-shaped cross section (Figure 6).

It would have been obvious to a person of ordinary skill in the art to modify Birang to include the elongated core has a generally U-shaped cross section as taught by Johansson in order to improve the sensitivity of the eddy current sensing system.

This is a provisional obviousness-type double patenting rejection.

23. Claim 22 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 8-10 of copending Application No. 10/124,507 (Birang et al. / herein referred to as "Birang") in view of Johansson et al. (herein referred to as "Johansson") and Kiko (2004/0150500) and Tada et al. (herein referred to as "Tada") (2002/0047705) and in further view of Murakami et al. (herein referred to as "Murakami") (6,057,684).

Birang in view of Johansson, Kiko, and Tada does not disclose the elongated core has a generally E-shaped cross section.

Murakami discloses the elongated core (51) has a generally E-shaped cross section (Figure 16).

It would have been obvious to a person of ordinary skill in the art to modify

Birang in view of Johansson, Kiko, and Tada to include the elongated core has a generally E-shaped cross section as taught by Murakami in order to improve the sensitivity of the eddy current sensing system.

This is a provisional obviousness-type double patenting rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David Schindler